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Remarks

The Examiner in the first official action (1) objected to the drawings, (2) rejected claims 1-23 and 30-32, under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim subject matter which applicant regards as its invention; (3) rejected claims 24, 27, 30, and 31 under 35 U.S.C. § 102; and (4) rejected claims 1-14, 19, and 21-23 as being obvious under 35 U.S.C. § 103. The Examiner also indicated that claims 15-18, 20, 25-29, and 32 were objected to as being dependent upon a rejected claim, but would be allowable if rewritten in independent form, including all the limitations of the base claim and any intervening claims.

Drawings

The Examiner objected to the drawings for failing to comply with 37 C.F.R. 1.84(p)(4) because reference character "46" had been used to designate both fan cavity and discharge port, reference character "66" had been used to designate both opposed end and dust collector canister and reference character "68" had been used to designate both opposed and end tubular portion. Applicant has reviewed the drawings and find no duplication on numbers in the drawings. However, the reference characters "46", "66" and "68" did designate multiple items in the Specification. Accordingly, the Specification has been amended to correctly designate fan cavity consistently with elsewhere in the Specification as reference character "44". Reference characters "66" and "68" used to designate opposed ends of the switch actuation bar 64 have been eliminated so as to remove the double designation. In view of these amendments is respectfully requested that the Examiner withdraw his objection to the drawings.

Claim Rejections — 35 U.S.C. § 112

The Examiner rejected claim 1 as lacking an antecedent basis to the terms the "central axis" and the "second end." The claim has been amended to provide the antecedent basis. The rejection of claims 11 and 12 for lacking antecedent basis have been addressed by

changing the "extension axis" in claim 11 and the "outer axis" in claim 12 to the previously claimed "central axis". Rejection of claim 16 has been addressed by changing the dependency of claim 16 from claim 1 to claim 14 thereby providing the proper antecedent basis to "the disc portion of the fan".

In claim 30 the Examiner rejected the claim due to no antecedent basis for "the fan" in line 10. Since there is a reference to "an integrally formed fan" in lines 5-6 of claim 30, this provides the necessary antecedent basis to use of "the fan" in line 10. It is requested that this rejection be withdrawn.

Although not mentioned by the Examiner, a review of the claims show that claim 23 should depend from claim 22 to provide proper antecedent basis for elements of that claim. This amendment has also been made.

These amendments do not narrow the claims, but clarify them for purposes of §112. In view of these amendments, the rejections should be withdrawn.

Claim Rejections — 35 U.S.C. § 102

Claims 24, 27, 30 and 31 were rejected under 35 U.S.C. § 102(b) as being anticipated by Fushiya, et al. U.S. Patent No. 5,018,314. Claim 24 has been amended so to indicate that the fan blades are angularly distributed around the axis in a nonuniform manner. This acts to balance the assembly about the axis. The nonuniform distribution of the fan blades distinguishes the '314 reference since the '314 patent discloses that "[t]he fins 32 [fan blades] formed on each surfaces are equally spaced apart from each other in a circumferential direction." (Column 3, lines 15-17.) Claim 24, and its dependent claim 27, are not shown, or suggested, by the '314 reference.

Claim 30 provides that the orbital sander have "the fan distributed around the axis in a non-uniform manner so to balance the drive member and platen about the axis without use of a balance weight." It is respectfully suggested that the '314 reference does not

anticipate claim 30, or its dependent claim 32. Specifically, claim 32 requires the fan not use a balance weight. The '314 reference shows use of balance weights 30b, 30c and states that "[t]he thick portions 30b, 30c act as balance weights for compensating imbalance of rotation caused by the eccentric shaft 26 when the rotary shaft 22 is rotated." (Column 3, lines 20-23.) Thus, this reference merely teaches the prior art discussed on page 2, lines 6-12 of the application. Due to its use of a pair of balance weights of thick cross-section, the '314 reference does not anticipate claim 30, or its dependent claim 31. Therefore, the objection of these claims should be withdrawn.

Claim Rejections Under 35 U.S.C. § 103

Claims 1-14, 19 and 21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Fushiya, et al. (U.S. Patent No. 5,108,314). The Examiner acknowledges that the '314 reference does not disclose a DC motor having certain characteristics set forth in the claims. The Examiner urges, however, that the claims are obvious "since it has been held that the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233." Applicant traverses this rejection. While it is true in some cases that discovery of claimed ranges involves only routine skill in the art, such law is not applicable in this case insofar as the '314 reference does not show the claimed permanent magnet DC motor. There is no suggestion in the prior art to substitute a DC motor for the traditional AC motor shown in the random orbit sander art. To the contrary, the '314 reference discloses a traditional universal AC motor. See, description of the motor in the '314 patent, column 2, lines 45-49 mentioning both the field coil and armature. It would not be obvious to substitute a DC motor for an AC motor in this application since orbital sanders are notorious energy hogs, which the prior art addressed by calling for AC motors. Therefore, the rejection of claims 1-14, 19 and 21 be withdrawn and the claims allowed to issue.

Claims 22 and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Fushiya, et al. (U.S. Patent No. 5,018,314) in view of Clowers, et al. (U.S. Patent No. 5,934,985). Claim 22, and its dependent claim 23, requires the orbiter sander have a dust

outlet with (1) a relatively small diameter tube and (2) a relatively larger diameter collar. The collar is spaced about the small diameter tube. The small diameter tube is sized to cooperate with a small diameter dust collection tube and the larger diameter collar is sized to alternatively cooperate with a large diameter tube or a porous dust collection cannister. Thus, the one dust outlet provides two attachment members for connection to three dust collecting devices, a small tube, a large tube and a cannister.

The Examiner acknowledges such a dust outlet is not shown in the '314 reference. He states that the '985 Clowers reference, when combined with the '314 reference supplies the missing dust outlet elements. It is respectfully suggested that one skilled in the art cannot read '985 reference to supply the missing elements. The dust outlet in the '985 reference merely shows only a smaller diameter tube 58. No separate larger connection spaced about the tube is provided, although the one smaller diameter tube can be adapted by use of adapter 64 to connect to a bag or filter housing. There is no corresponding larger diameter collar shown. The Examiner improperly attempts to use one element, the tube, to meet the claims requirement to have two separate elements. Thus, the claims requirement for the contemporaneous existence of both a relatively small diameter outlet tube and a relatively larger diameter collar spaced thereabout the tube is not shown or suggested by the '985 reference. Therefore, it is requested that the rejection of claim 22 and its dependent claim 23 be withdrawn and the claims allowed to issue.

Allowable Subject Matter

Applicant recognizes the Examiner's statement that claims 15-18, 20, 25-29, and 32 were objected to as being dependent upon rejected base claims, but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims. In view of the above comments, it is not believed necessary at this time to rewrite any of these claims in independent form.

Conclusion

In view of the above comments and amendments, it is requested that the Examiner's rejections and objections be withdrawn. Accordingly, it is respectfully submitted that the case be reconsidered and allowed.

If the Examiner has any questions or concerns regarding the application, he is invited to telephone the undersigned so that the matter can be promptly handled and the case passed on to issue.

Respectfully submitted,

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By _____

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Attachment

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In The Specification

Please amend the paragraph beginning on page 5, at line 4 with the paragraph shown below.

Preferably, the eccentric drive hub 26 further includes a fan 36 for cooling the motor and for collecting dust. Fan 36 has a disc portion 38 and a plurality of lower fan blades 40 and upper fan blades 42. Rotation of the motor output shaft 24 causes fan 36 to rotate about central axis 14. The fan moves air radially outward from a region adjacent the motor axis to a zone outboard of the fan periphery. The fan additionally causes the air to swirl in a counter-clockwise direction (when viewed from the bottom in Figure 4) within the fan cavity [46] 44 which is formed in the second end 20 of housing assembly 12. Lower fan blades 40 cause air to be drawn through ports 50 formed in sanding platen 30 in order to collect dust formed by the sanding process. Additionally, fan 40 tends to draw air through the annular opening formed between the sanding platen outer periphery and housing 20. However, this flow path is obstructed by annular seal/brake 52 which serves to provide a friction brake limiting the free spinning velocity of the sanding pad when the motor is energized without the sanding platen engaging a work piece.

Please amend the paragraph beginning on page 8, at line 8 with the paragraph shown below:

The orbital sander 10 further includes a power supply 60 oriented in the housing first end 12. Power supply 60 has an AC input, i.e., a typical power cord (110 volt or 220 volt depending on the country), a DC rectifier circuit and a DC output supplying power to the motor. A on/off switch 62 is preferably mounted on the power supply board safely within the housing where it is not exposed to dirt and physical abuse. In the preferred embodiment illustrated, a switch actuation bar 64 is provided which extends transversely through the housing and is shiftable along the axis lying in a plane perpendicular to the motor axis 14. The switch actuation bar 64 has opposed ends [66 and 68], at least one of the ends always projects outward of the housing so as to be accessible to the operator. The switch actuation bar is pushed in one direction to turn the motor on and in the opposite direction to turn the motor off. This push/push design is simple for the operator to understand and provides a visual indication of whether the sander is in the on or off state, even when the sander is not plugged in. It is likewise easy to seal the switch actuation bar relative to the housing in order to prevent dirt and dust from reaching the on/off switch 62. The switch actuator bar is provided with a cam surface which cooperates with the switch bottom as illustrated in phantom outline in Figure 2 to operate the switch.

In The Claims

Please amend the claims as shown below:

1. (Amended) An orbital sander comprising:

an elongate tubular housing aligned along the central axis having a first end, a second end and a central tubular region in the second end;

a high speed permanent magnet DC motor disposed within the housing central tubular region, the motor having a cylindrical body with a central axis and a rotary motor shaft generally coaxially aligned with the central axis;

an eccentric drive shaft rotatably driven by the motor shaft about the central axis and having a drive member eccentrically offset from the central axis;

a sanding platen oriented adjacent to the housing second end and orbitally driven by the drive member, the platen having a planar surface perpendicular to the central axis adapted to receive sand paper; and

a bearing interposed between the sanding platen and the eccentric drive shaft drive member freely rotatably connecting the sanding platen and drive member to cause the sanding platen to orbit as the motor rotates.

11. (Amended) The orbital sander of claim 1 wherein the sanding platen is freely mounted to the housing by the bearing and is capable of rotating about the [extension] central axis in order to operate in a random orbit manner.

12. (Amended) The orbital sander of claim 1 wherein the sanding platen is mounted to the housing by a retainer which allows relative orbital movement of the sanding platen relative to the housing, but prohibits free rotation of the sanding platen about the [outer] central axis.

16. (Amended) The orbital sander of claim [1] 14 wherein the disc portion of the fan is generally uniform in thickness and each of the plurality of fan blades are generally uniform in thickness enabling the eccentric drive to be integrally formed as a metal die casting minimum porosity.

22. (Amended) The orbital sander of claim 21 wherein the dust outlet is formed by a relatively small diameter outlet tube having a relatively larger diameter collar spaced thereabout, the small diameter tube sized to cooperate with a small diameter dust collection tube and the larger diameter collar sized to alternatively cooperate with a large diameter tube or a porous dust collection cannister.

23. (Amended) The orbital sander of claim [21] 22 wherein the relatively small dust outlet tube is a nominal diameter to 1" to 1 ½ while the collar has a diameter of 2" to 2 3/4 ".

24. (Amended) An assembly for an orbital sander comprising:

a drive member rotatable about an axis and having an eccentrically offset hub and a plurality of fan blades;

a sanding member connected to the hub; and

the fan blades distributed angularly around the axis in a non-uniform manner to balance the assembly about the axis.